

Application No: 09/816,529
Attorney Docket No. 30-4336 (4510)
Page 2

Amendments to the Claims:

1. (currently amended) Method for separating difluoromethane from a mixture of ~~said~~ difluoromethane and at least one impurity, said method comprising the steps of:
extractively distilling said mixture using dichloromethane as an extractive agent to produce an overhead stream of purified difluoromethane having a concentration of said at least one impurity lower than that of said mixture, and a side stream and a bottoms stream, said side stream comprising a mixture of dichloromethane and said at least one impurity, said bottoms stream comprising dichloromethane and a concentration of said at least one impurity having a concentration less than that of said side stream; and
supplying at least a portion of said side stream to a fluorination reaction which produces said ~~mixture of~~ difluoromethane.

2-3. (cancelled)

4. (previously presented) The method of claim 1, wherein said at least one impurity is a chlorinated impurity having the formula:



wherein each X is an independently selected halogen, $y > 1$ and $w + y + z = 4$.

5. (original) The method of claim 4, wherein X is fluorine.

6. (original) The method of claim 4, wherein said chlorinated impurity is selected from the group consisting of chlorofluoromethane, chloromethane, chlorodifluoromethane, dichlorodifluoromethane and combinations of two or more thereof.

Application No: 09/816,529
Attorney Docket No. 30-4336 (4510)
Page 3

7. (original) The method of claim 6, wherein said chlorinated impurity is selected from the group consisting of dichlorodifluoromethane, chloromethane and combinations thereof.
8. (previously presented) The method of claim 1, wherein the concentration of said at least one impurity in ~~said~~the purified difluoromethane is no greater than about 50 ppm by weight.
9. (currently amended) The method of claim 8, wherein the concentration of said at least one impurity in ~~said~~the purified difluoromethane ~~HFC-32~~ is no greater than about 10 ppm.
10. (currently amended) The method of claim 1, wherein the yield of said purified difluoromethane ~~HFC-32~~ is no less than about 80%.
11. (previously presented) The method of claim 1, wherein the step of extractively distilling is conducted at a pressure of about 1 to about 15 bars.
12. (previously presented) A method for purifying difluoromethane comprising the steps of:
 - fluorinating a dichloromethane to produce a reactor stream comprising a mixture of difluoromethane and at least one impurity;
 - feeding said mixture to a distillation unit;
 - feeding an extractive agent to said distillation unit, wherein said extractive agent is said dichloromethane;
 - operating said distillation unit under conditions sufficient to distill a product stream comprising said difluoromethane and a concentration of said at least one impurity less than that of said reactor stream;
 - withdrawing a side stream from said distillation unit, said side stream comprising said impurity and said extractive agent;

Application No: 09/816,529
Attorney Docket No. 30-4336 (4510)
Page 4

withdrawing a bottoms stream from said distillation unit, said bottoms stream comprising said extractive agent and a concentration of said impurity less than that of said side stream;
supplying the fluorination reaction with at least a portion of said side stream;
and
recycling at least a portion of said bottoms stream to said distillation unit.

13-15. (cancelled)

16. (original) The method of claim 12 wherein the step of extractively distilling is conducted at a pressure of about 1 to 15 bars.

17. (previously presented) A system for the preparation of a fluorinated compound comprising:

- a fluorination reactor connected to a source of dichloromethane, a source of fluorine, and a source of recycled dichloromethane from a distillation unit to facilitate fluorination of dichloromethane and to produce a reactor stream comprising a mixture of a fluorinated compound and an impurity;
- a first conduit for feeding said mixture to a distillation unit;
- a distillation unit connected to said first conduit and to a source of dichloromethane for extractive distillation of said mixture to produce an overheads stream, a side stream, and a bottoms stream;
- a second conduit for supplying at least a portion of a side stream to said fluorination reactor;
- a third conduit for recycling at least a portion of said bottoms stream to said distillation unit; and
- a valve connected to said third conduit for diverting a portion of the bottoms stream from said distillation unit to said fluorination reactor.

Application No: 09/816,529
Attorney Docket No. 30-4336 (4510)
Page 5

18-19. (cancelled)

20. (previously presented) Method for separating difluoromethane from a mixture of said difluoromethane and at least one impurity, said method comprising the steps of:
- extractively distilling a mixture of difluoromethane, dichlorodifluoromethane and methyl chloride obtained from a fluorination reaction using dichloromethane as an extractive agent to produce an overhead stream of purified difluoromethane having a concentration of said dichlorodifluoromethane and of said methyl chloride lower than that of said mixture, and at least one extractive agent stream comprising a mixture of dichloromethane, said dichlorodifluoromethane and said methyl chloride; and
- supplying at least a portion of said extractive agent stream to said fluorination reaction.